EXHIBIT 122

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re Flint Water Cases	Civil Action No. 5:16-cv-10444-JEL-MKM (consolidated) Hon. Judith E. Levy Mag. Mona K. Majzoub
Elnora Carthan, et al. v. Governor Rick Snyder, et al.	Civil Action No. 5:16-cv-10444-JEL-MKM

DECLARATION OF CLIFFORD P. WEISEL, M.S., Ph.D., IN SUPPORT OF PLAINTIFFS' MOTION FOR CLASS CERTIFICATION

I, Clifford P. Weisel, M.S., Ph.D., state and declare as follows:

I. INTRODUCTION

1. My name is Clifford P. Weisel. I am a resident of Teaneck, New Jersey. I am providing this Declaration in Support of Plaintiffs' Motion for Class Certification. I am legally competent to provide this Declaration. I have been retained as an expert in exposure science, as it applies to public health, on behalf of a putative class as well as a subclass of children in the City of Flint who were exposed to Flint Water between the period of May 1, 2014 through January 5, 2016. I have been asked to evaluate whether the drinking water levels at the

homes, schools, or day care settings of children who were *in utero* and up to age 10 in the city of Flint during that time period would have exhibited increased lead in water due to the change in water supply to Flint River-sourced water on April 25, 2014. I was further asked that if I was of the opinion that there was an increase in the water lead levels in Flint to provide assistance in defining criteria to identify the homes, schools and daycares where such increased lead in water would have caused increased lead ingestion exposure.

II. QUALIFICATIONS

2. I am a professor and scientist, with an expertise in exposure science. I have a master of science degree in analytical chemistry and a doctoral degree in chemical oceanography. As my *Curriculum Vitae* (attached as Exhibit 1) reflects, my current academic appointment is as a tenured Professor of Public Health at Rutgers, The State University of New Jersey, director of the graduate program in Exposure Science and member of the Environmental and Occupational Health Sciences Institute of Rutgers University. From 2002 to 2015 I was a tenured professor in the Department of Environmental and Occupational Medicine in Robert Wood Johnson Medical School at the University of Medicine and Dentistry of New Jersey, which merged with Rutgers University in 2013. I joined the Department of Environmental and Community Medicine (which became the Department of Environmental and Occupational Medicine) at Robert Wood

Johnson Medical School in the University of Medicine and Dentistry of New Jersey as an assistant professor in 1989 and was promoted to Associate Professor in 1994 and to Tenured Professor in 2002. I was Deputy Director of the Exposure Measurement and Assessment Division of the Environmental and Occupational Health Sciences Institute from 1995 to 2018 and have been the director of the Graduate Program of Exposure Science at Rutgers University since 1994. Prior to my appointment at Rutgers University I was a research scientist and adjunct professor at the College of Staten Island, through the research foundation of the City University of New York (CUNY). I had a National Research Council post-doctoral fellowship at the National Oceanographic and Atmospheric Administration from 1981-1983.

3. I received my Ph.D. degree from the University of Rhode Island in Narragansett, RI in 1981, a Master of Science from the University of Rhode Island in Kingston, RI in 1978. A more complete statement of my credentials is contained in my *curriculum vitae*, a copy of which is attached as Exhibit 1.

4. In terms of specific scientific expertise, since 1990, I have led multi-institutional and international teams of scientists, students and research fellows devoted to investigating exposure to environmental contaminants. I have been treasurer and president of the International Society of Exposure Science and was assistant editor of the Journal of Exposure Science and Environmental

Epidemiology from 1995 to 2002. I have received the New Jersey Center for Environmental Indicators Excellence Award, Forchhenner Visiting Professorship of Genetics at Hebrew University, and the International Society of Exposure Science Jerome J. Wesolowski Award in recognition of outstanding contributions to the knowledge and practice of human exposure science.

5. I have been the major of advisor of 14 doctoral students and 10 post-doctoral fellow and committee member of 32 graduate students studying Exposure Science. I direct the doctoral degree program in Exposure Science and have been principal investigator of a National Institute of Environmental Health Sciences (NIEHS) T32 Training Grant Award in Exposure Science since 2011, the only such training grant awarded by NIEHS that has a focus on Exposure Science. I co-teach graduate courses in Exposure Measurement and Assessment, Environmental Health, and a Journal Club on Exposure Science.

6. I have published more than 130 peer review journal articles and book chapters, including a book co-authored with Paul J. Lioy in 2014 entitled: Exposure Science: Basic Principles and Applications. Elsevier Press/Academic Press. These publications have included examinations of environmental exposure to children and exposure to lead in multiple media. I have been funded to study environmental exposures by numerous entities including: the National Institution of Environmental Health Sciences, the United States Environmental Protection

Agency, the Agency for Toxic Substance and Disease Registry/Center for Disease Control and Prevention, the Federal Aviation Administration, the Mickey Leland National Urban Air Toxic Research Center, the Health Effects Institute, the New Jersey Department of Health, the New Jersey Department of Environmental Protection, the American Chemistry Council, L'Oreal Corporation, and Exxon Mobile.

7. I have served on various scientific expert panels relating to exposure science for various state and federal agencies. I currently am a member of the Board of Trustees of the Health Effects Science Institute (HESI), a standing member of the US Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel, the US Environmental Protection Agency Board of Scientific Councilors for the Chemical Safety and Sustainability National Research Program-Human and Environmental Risk Assessment National Research Program Subcommittee, and the New Jersey Department of Environmental Protection Science Advisory Boards' Public Health Standing Committee. I have been a member of several National Academy of Sciences Committee and multiple National Institute of Health and US Environmental Protection Agency review panels, among other international and national forums that require a scientist with expertise in exposure science.

8. The principles and methodology I employed in forming my opinion are based on my review and interpretation of peer-reviewed scientific literature, publicly available data, information obtained in the discovery process in this case and more than 30 years of teaching and conducting research on Exposure Science that are relevant to exposure to lead from drinking water. I also rely upon the expert declarations of colleagues (Dr. Larry Russell, and Dr. Pierre Goovaerts, as well as the Deposition of U.S. EPA employee, Michael Schock). It is scientifically valid and generally accepted to predict changes in lead exposure based on fundamental chemical principles of water chemistry in combination with the extensive site specific data regarding water lead levels, the presence of lead and galvanized service lines, galvanized interior pipes, lead-soldered copper plumbing, and other factors that affect lead water concentration in the drinking water at homes, schools, and day care facilities in Flint.

9. Specific scientific treaties, articles, and publications I relied on in forming my opinion are referenced in the text and listed in Exhibit 2 in my List of References and are based on generally accepted scientific principles in the disciplines of exposure science and chemistry of water distribution systems.

III. STATEMENT OF OPINION(S)

10. Details of my opinions are provided in Section IV of this declaration and are summarized as follows:

a. *My opinion is that children and pregnant women who consumed unfiltered tap water over a period of at least 90 days in Flint at homes, schools or daycare establishments that meet Criteria 4, 5 and 6 in Dr. Hu's Declaration between May 1, 2014 and January 5, 2016 ingested increased concentrations of lead as a result of Flint's change in water to the Flint River.* (see Section IV, 1)

b. *It is my opinion that the failure to use appropriate corrosion control treatment when the water source for Flint was switched on April 25, 2014 caused a disruption of the protective layer on the surface of pipes and plumbing fittings and fixtures resulting in soluble and particulate lead in the tap water in residences, day care centers and schools.* (See Section IV, 2)

c. *It is my opinion that homes, day care centers, and schools that had lead service lines, galvanized steel service lines with connectors containing lead, or interior plumbing that had lead solder or other lead containing fittings and fixtures (i.e. structures built prior to 1986 that did not have complete plumbing upgrades) would have increased lead in their tap water because of the corrosivity of the water resulting from the change of water source on April 25, 2014.* (See Section IV, 3)

d. *It is my opinion that water lead levels were elevated in Flint between May 1, 2014 and January 5, 2016 in homes, day care centers, and schools if they had service lines or interior plumbing whose properties make them a likely source of lead. Further, that opinion would be true even if a single or small number of water samples collected in those buildings measured below the lead minimum reporting limit since water lead levels vary with time and depend upon the sampling conditions used.* (See Section IV, 4)

11. I have been asked, in this declaration, to apply fundamental exposure science principles to: (1) identify if the changes in Flint's water source implemented on or about April 25, 2014 would have caused an increased level of lead in the distribution of water to homes, schools and daycare centers in Flint; and (2) if the answer to the first question is yes, then to assist in establishing the criteria for identification of the homes, schools and daycare establishments that were more likely than not to have experienced the increased levels of lead in their water.

12. In the following paragraphs, I set out my recommendations for such a methodology, with the scientific rationale (facts or data considered) described in Section IV.

13. Towards identifying a "subclass of injured children" I will be identifying what parameters would lead to exposure to lead in water that was a direct result of

the change in source of Flint's drinking water to the Flint River. Doing so presents several challenges since residential tap typically varies spatially (i.e. across locations within the city depending on the condition and type of service line, connectors, and indoor plumbing at each location an individual consumes tap water or item prepared with tap water); and temporally (i.e. over time - the course of a day, week, and month, because of flushing, water flow, local pipe and interior plumbing conditions). Nonetheless, my approach relies upon general scientific principles of water chemistry, in conjunction with information about the presence of lead and galvanized service lines and information regarding the composition of lead solder, plumbing and fixtures in the interior of Flint's housing stock. This approach is consistent with appropriate scientific methodologies within the discipline of exposure science.

14. I have reviewed the steps set forth in the Declaration of Howard Hu that proposes a methodology for identification of "a subclass of injured children." This declaration provides opinions related to specific criteria incorporated in Dr. Hu's methodology as it relates to the "eligible period of exposure" (the period of May 1, 2014 – January 5, 2016), as well as the likelihood of increased lead exposure in residences, schools and daycare centers that meet Criterion 4, 5 or 6 of Dr. Hu's Declaration.

IV. FACTS OR DATA CONSIDERED

1. Lead Exposures from Drinking Water to Flint Residents

A stated in Section III,a, my overall opinion is lead exposure would have occurred to children and pregnant women, and therefore their fetuses, due to the change in water source on April 25, 2014 when they consumed tap water in Flint for 90 days between May 1, 2014 and January 5, 2016 if they meet Criteria 4, 5 or 6 in Dr. Hu's Declaration and that water was not filtered to remove lead. The reasons for this opinion are based on the fundamental scientific principles that govern how lead enters into the drinking water within a water distribution system. Drinking water contains lead when pipes, connectors, fittings, and/or solder used in the water distribution system are made of lead or have lead deposits on them and conditions are not maintained to minimize any release of lead into the water. Lead exposure associated with drinking water is a function of the lead water levels, how much lead is transferred to food cooked with the water, and the amount of water and beverages or food prepared with the water that is consumed. This declaration evaluates whether residents of Flint had lead ingestion exposure because of changes made to the source of water used in the water distribution system in Flint starting April 25, 2014. The initial step in that exposure assessment is to determine if the water lead levels were increased because of that change and if so, what conditions contributed to lead in the tap water in homes, day care centers, and

schools in the community. The underlying assumption for this evaluation was the drinking water supply for the city of Flint was changed on April 25, 2014 from Detroit-supplied Lake Huron water to the Flint River without implementing a corrosion control program to minimize lead released from pipes, connectors, solder, and fittings within the distribution system and interior plumbing of homes, day care centers, and schools. As described in detail below, my opinion is this would have resulted in lead being released into the drinking water into the vast majority of homes, schools, and day care centers that were served by the Flint water system, thereby exposing the residents of Flint who meet the criteria *in Dr. Hu's Declaration* to lead.

2. Role of Corrosion Control on Water Lead Levels

As stated in Section III, b, it is my opinion that the failure to use appropriate corrosion control treatment when the water source for Flint was switched on April 25, 2014 caused a disruption of the protective layer on the surface of pipes and plumbing fittings and fixtures resulting in soluble and particulate lead in the tap water in residences, day care centers and schools.

Whenever changes to a water source or treatment practice are done to a water distribution system, the American Water Works Association (AWWA) Manual on Drinking Water Systems (Hill 2011) recommends that a corrosion control program be "reevaluated, revised and reimplemented". The AWWA is an

international, non-profit organization that provides guidance to ensure safe and clean drinking water, and to which more than 50,000 public water supply systems belong. A corrosion control plan is necessary so that water distribution systems develop a stable passivation layer, along with scale deposits, on the interior the metallic pipes and fittings to avoid lead reaching a consumer's tap (USEPA 2016a). The passivation layer is composed of insoluble oxidized metal compounds (e.g. lead carbonate, lead oxides, and in the presence of added phosphate - lead-phosphate compounds) and scale material formed when metals (e.g. iron, manganese, aluminum, calcium, copper) in the water precipitate onto or sorb to the interior surfaces of the pipes and plumbing in distribution system and premises being served. These layers and scale materials incorporate lead into their structure and their characteristics dictate how susceptible they might be to releasing particulate or soluble lead (Sandvig, Kwan et al. 2008, Kim and Herrera 2010, Triantafyllidou and Edwards 2012, USEPA 2016a). A passivation layer protects lead pipes, lead solder, and plumbing fittings containing lead from oxidants in the water and corrosion which can leach lead into the drinking water. This layer would have been established in the water distribution system in Flint in the decades prior to April 2014 when appropriate lead corrosion control was deployed with the Detroit-supplied Lake Huron water. When the water source was changed on April 25, 2014, the lack of corrosion control, variable pH, and high chloride levels

resulted in a more corrosive water being delivered through the Flint water distribution system, altering the equilibrium necessary to maintain the passivation layer and the scale material (I rely on Dr. Russell's Declaration in part as the basis for this, as well as the Deposition of U.S. EPA employee, Michael Schock). This resulted in the release of lead into the water, exposing water consumers to lead (Torrice 2016).

Appropriately controlling water chemistry is the common approach used by water companies to keep lead levels low in the water delivered to consumers, since corrosive water liberates lead from pipes, solder and plumbing fittings (Renner 2010). The US EPA addressed the issue of corrosion leading to elevated lead and copper levels in drinking water as part of the Lead and Copper Rule (LCR). A requirement of the LCR is corrosion control treatment should be used to prevent lead contaminating drinking water and "Corrosion control treatment means utilities must make drinking water less corrosive to the materials it comes into contract with on its way to consumers' taps" (USEPA 2017). The change in the water's characteristics and corrosive nature in the Flint water distribution system starting April 25, 2014 was reported by the residents who complained about the color, taste, and odor of their drinking water, and by the General Motors Corporation which switched to using water from Flint Township instead of the city of Flint due

to the corrosive effects of the water on its engine parts (Masten, Davies et al. 2016, Masten, Davies et al. 2019).

When a passivation layer is disrupted the metals contained in that layer, including lead, are released both as dissolved metals and as small particles due to flaking (Dingle 2016, Torrice 2016). Lead would have been present in the passivation layer and scale material in the water distribution system in Flint due to the presence of lead service lines and older homes that had lead solder and lead lines in their interior plumbing. Thus, lead was released into the drinking water when the water source was changed for Flint and delivered to sink taps particularly in buildings with lead service lines, galvanized service lines, or indoor plumbing that included lead pipes or lead solder fitting (Lytle, Schock et al. 2019) (I also rely upon the deposition of U.S. EPA employee, Michael Schock).

3. Sources of Lead to Tap Water

As stated in Section III, c it is my opinion that homes, day care centers, and schools that had lead service lines, galvanized steel service lines with connectors containing lead, or interior plumbing that had lead solder or other lead containing fittings and fixtures (i.e. structures built prior to 1986 that did not have complete plumbing upgrades) would have increased lead in their tap water because of the corrosivity of the water resulting from the change of water source on April 25, 2014.

Lead service lines are a major source for lead in drinking water in residences, schools, and other buildings (Sandvig, Kwan et al. 2008). Lead service lines were used on a major scale beginning in the late 1800s, with it becoming the predominant material for water service lines in large cities by 1900 since, even though it was more expensive than iron pipes, it lasted longer and was more malleable (Rabin 2008). Lead service lines had been replaced with galvanized steel and more recently with copper and various plastics pipes as concern with lead toxicity increased. During this period the water's corrosiveness would have disrupted the protective layers that had previously established on these lead service lines resulting in dissolved and particulate lead being in the tap water delivered to the consumer.

Indoor plumbing in buildings that have lead solder connecting pipes, lead pipes, and fixtures containing lead are sources of lead in tap water. In 1986, Congress enacted the Safe Drinking Water Act Amendments (US_Congress June 19, 1986) requiring plumbing materials that provided water for human consumptions had to be 'lead-free', i.e. solder and flux could contain no more than 0.2% lead and pipes no more than 8% lead. Prior to 1986 lead solder, which is commonly 50% lead and 50% tin, was frequently used to connect metal indoor plumbing pipes. In 2011, the Safe Water Drinking Act revised "lead free" to be a weighted average of 0.25% lead across the wetted surfaces of a pipe, pipe fitting, plumbing fitting, and fixture;

and that solder and flux not contain more that 0.2% lead. The pipes and indoor plumbing materials that were installed prior to the 1986 regulation would leach lead into the water delivered to the consumer when the more corrosive water contacted them. In Flint, approximately 99% of homes were built prior to 1986, so if they did not have their interior plumbing replaced prior to April 2016 they would likely have lead solder and/or lead piping present. In addition to my knowledge and the references cited, I rely on the declarations by Drs. Goovaerts and Russell for the basis for these statements.

Galvanized steel piping has a zinc layer that contacts the drinking water and contains lead originating from upstream lead sources, such as lead service lines or lead pigtails that connect the service lines to the main (Clark, Masters et al. 2015). Leaching of lead from or disrupting the lining causing flakes of metals from the protective layers on galvanized pipe can be a major source of lead in the tap water.

Thus, in homes, day care centers, and schools in Flint during the time period following the water source changeover, lead would have been mobilized into the drinking water from the pipes, connectors, and service lines as the passivation layer and scale material were disrupted. This would be from in flaking of lead containing metal particles and exposing the metal surfaces below that layer from which soluble lead would be leached (Dingle 2016, Torrice 2016). Further, the interior plumbing in buildings, which includes piping, fittings, solder, and fixtures

that contained lead or metal deposits would also release lead into the drinking water due to the corrosive nature of the water delivered to their homes (Triantafyllidou and Edwards 2012). The metal deposits on the surfaces listed above would degrade further as the corrosive water flowed through them due to mechanical friction of the water over the weakened layer or when the water remained stagnant in the pipes and fittings (i.e. contacting their interior surfaces for extended time periods) due to water not being used in a home for hours allowing chemical reactions with the layer and surfaces to occur (Schock and Lemieux 2010, Lytle, Schock et al. 2019).

It should be noted that prior to the change in water source on April 25, 2014, the sampling done to meet the lead and copper rule (LCR) indicated that the water supplied to Flint met the LCR requirements (Masten, Davies et al. 2016; Masten, Davies et al. 2019; See also, Aug. 14-2019 EGLE 0002603-4). The LCR sampling done in 2011, the last year that Flint was required to provide monitoring data for the LCR prior to the change in water sources, reported that no homes from which water samples were collected had levels above the minimum reporting limit of <2 µg/L (City_of_Flint 2011). Similarly, in 2008, Flint's LCR compliance sampling did not identify a single water sample above the minimum reporting limit. (Aug. 14-2019 EGLE 0002603-4)

4. **Lead Water Level Variations in a Home over Time**

As stated in Section III, d, it is my opinion that water lead levels would be elevated in Flint between May 1, 2014 and January 5, 2016 in homes, day care centers, and schools if they had service lines or interior plumbing whose properties make them a likely source of lead as described above. Further, that opinion would be true even if a single or small number of water samples collected in those buildings were below the minimum reporting limit since water lead levels vary with time and depend upon the sampling conditions used.

The lead concentration in drinking water varies during a single day and across days within a single household (Schock 1990). In addition, lead tap water concentrations varied among homes within Flint neighborhoods as a function of the type of service line, interior plumbing, and the water usage (Goovaerts 2017, Pieper, Martin et al. 2018). Further, the water lead levels in homes which had multiple samples collected over several hours in a single day, both during and after the crisis period were highly variable (Pieper, Tang et al. 2017, Lytle, Schock et al. 2019).

The amount of dissolved lead leached from fittings or pipes containing lead depends in part upon how long the water is stagnant, i.e. contacts fittings, solder, or pipes without moving, and the level of water corrosivity, while the particulate lead concentration is affected by the water corrosivity and water flow pattern (Clark,

Masters et al. 2014). Thus, the water lead levels can vary greatly depending upon how and when a water sample is collected in a home, day care center, or school. Samples, typically 1 liter in volume, taken when a cold water tap is first opened after no water was flushed through the interior plumbing for at least six hours is known as a first-flush draw sample (USEPA 2016b). That water is primarily in contact with the faucet fittings and lines immediate attached to the faucet. This water is what a family might consume when they first wake or in the evening if no one had been in the home during the day. In schools and commercial day care settings which have more extensive interior plumbing and specific locations designated for drinking, EPA recommends a 2-step sampling protocol using 250 ml bottles after an 8 to 18-hour stagnation period, to evaluate the lead water levels from the “outlet” (faucet, fixture, fountain) and from the plumbing behind the wall (USEPA 2018).

The first flush sample typically does not contain water from the multiple sections of interior plumbing or the service line, which were among the sources of lead to the tap water in Flint. This is because more than one liter of water, the volume suggested to be collected by EPA for home sampling, is usually contained between a faucet and the lines in the majority of the plumbing in a home leading to the service line. Water samples collected at different times after a tap is first opened can have different lead levels dependent upon how long, the flow rate, and

what portion of the plumbing the water was in contact with in homes and larger facilities such as schools (Schock 1990, Schock and Lemieux 2010, Deshommes, Andrews et al. 2016, Katner, Pieper et al. 2018, Miller-Schulze, Ishikawa et al. 2019; See also, VATECH_00212274). When sequential water samples were taken in Flint homes after water corrosion protocols were put back into place, elevated and variable lead water levels were found (Lytle, Schock et al. 2019). The variation in water lead levels in sequentially collected water samples in a single home is because each sequential water sample had been in contact with different sections of the inner plumbing and the service line for hours. This resulted in varying amounts of lead leaching or flaking into each water sample collected. Lytle, Schock et al. 2019 indicated that, dependent upon the home, water volumes of between ~2 and ~5 liters of water had to be collected before the water that had contacted the service line for hours was obtained. The range in volume is because the length and diameter of plumbing pipes between the service line and faucets, and the service line itself varies among homes. The authors further indicated that in excess of 10 liters of water had to be collected before the water was from the water main and had not been sitting within the service line or interior plumbing for extended time periods. However, even after that amount of water was collected elevated lead levels were present in some samples collected.

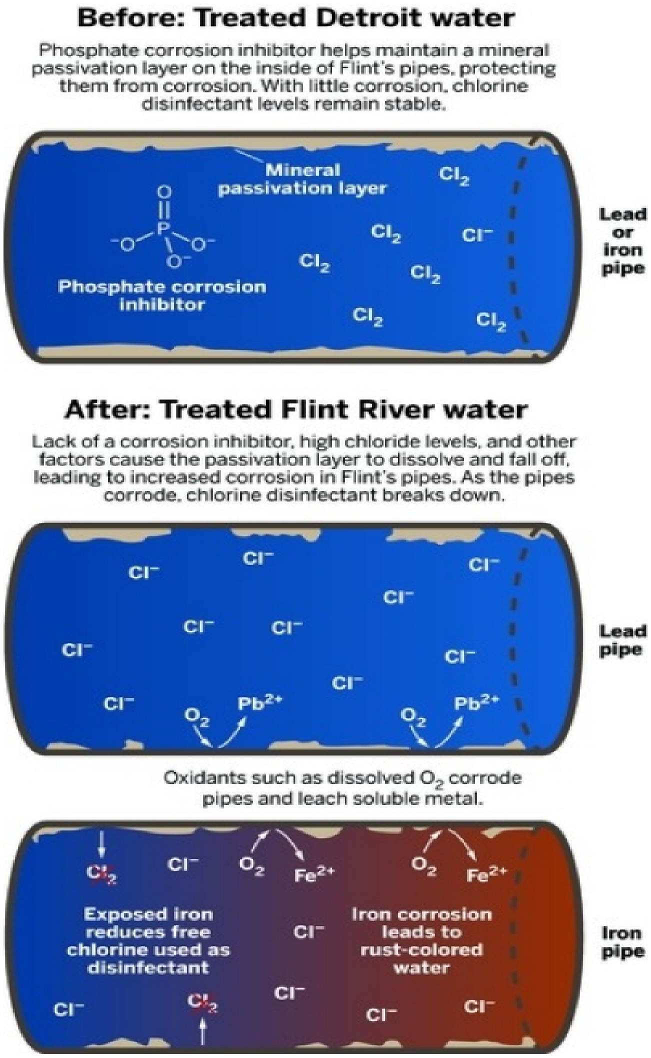

Figure 1, Schematic of how corrosion can affect passivation layer and lead to lead entering the water. From Chemical and Engineering News "How Lead Ended Up in Flint's Tap Water (Torrice 2016)

Water collected after an extensive flush, which essentially draws water from the water main with minimal contact time with service lines and indoor plumbing, is typically low in lead, often at below the minimum reporting limit, unless the water movement caused flaking from the service line or interior plumbing. One reason for variations in water lead levels is due to sporadic flaking of the passivation layer and scale deposits. As discussed above and shown in Figure 1 from a Chemical and Engineering News article (Torrice 2016) this process begins with the corrosion of the layer. However, as water is flushed through the pipe small particles or flakes from the layer and scale can come off due mechanical stress on weakened sections. These small particles will result in highly variable lead concentrations in the water levels being present dependent on how many particles are in a particular sample and, since their release

into the water is intermittent, exposure to residents could go undetected if a single or only a few samples are collected from a home (Triantafyllidou and Edwards 2012, Clark, Masters et al. 2014). Even if the lead containing particles are collected in a water sample, if that water sample is not shaken completely before analysis, some or all of the particulate lead may not be analyzed leading to underestimation of the lead in the water.

The lead water levels reported in samples collected in Flint during the water crisis period and subsequently, when steps were put in place to try to control water's corrosion, show the variability expected to be associated with only a limited number of samples being collected repeatedly in individual homes, day care centers, or schools (Lytle, Schock et al. 2019, Mantha, Tang et al. 2020) (Expert Declaration of Pierre Goovaerts). That is because they represent a single point in time and not the entirety of the water lead levels reaching the tap and potentially consumed. As discussed above, Lytle, Schock et al. 2019 measured the water lead levels in sequential water samples collected from homes in Flint and related individual water samples with the portion of the plumbing that they were likely have been stagnant in, based on the volume of water collected. The water lead levels in these samples, collected after corrosion controls were implemented (sampling dates: 1-28 to 3-31-16, 7-12 to 7-22-16, 9-1 to 9-24-16 and 10-26 to 11-15-16) show evidence that soluble lead was still being leached from and particulate

lead flaked off from the service lines and interior plumbing in the homes, even after Flint's water source had been switched back and corrosion control reinstated. Mantha, Tang et al 2020 showed similar changes in water lead levels in sequential samples collected in two homes after April 2016. These studies document that lead was entering the tap water from different segments of the interior plumbing and service lines of homes in Flint.

During the crisis period, sequential water samples were measured in a single home in 2015 when the corrosive water was still being supplied to Flint (Pieper, Tang et al. 2017). This home was under investigation by the USEPA because of high lead water levels and had rust colored water attributed to flaking of an iron scale layer from the plumbing lines leading to and interior within the home. High variability in water lead levels was observed for soluble lead, which appeared to decline as the water continued to flush through the pipes. Particulate lead was also in the tap water sample due to its being mobilized from the surfaces of the lines at low and higher flow rates. Spikes in lead levels, of 3655 and 6048 µg/L, related to particulate lead were observed when the flow was adjusted from a low flow to a moderate flow. Water iron levels was also elevated in these samples, above the EPA secondary maximum contamination level of 0.3 mg/L. This indicates that the pipe and the stabilizing scale material were being corroded, which contributed to

the lead being released into the water and resulting in exposing additional lead surfaces to the corrosive water.

The most extensive study of water lead concentrations across different homes during the crisis period included 268 homes and was done in August to November 2015 (Pieper, Martin et al. 2018; See also VATECH_00212274). The study measured lead levels in first draw (1 L), 1-minute flush (~0.5 L flush + 0.5 L sample), and 3-minute flush (~1L flush + 0.125ml sample) samples. The same homes were contacted again after water corrosion control was put back in place in March, 2016, July 2016, November 2016, and in August 2017, and samples were obtained from 186, 176, 164, and 150 homes, respectively. Of the 268 homes sampled during the crisis, 85% had lead levels above the Minimum Reporting Level (MRL) of 1 µg/L or part per billion (ppb) in the first draw sample with 17% of those samples exceeding the USEPA action level of 15 µg/L. All homes measured during the 2015 sampling period in Flint had at least one sample with detectable lead above the 0.1 µg/L the instrumentational detection limit (as discussed in Dr. Goovaerts declaration). The 90th percentile water lead level was 26.8 µg/L and the maximum water lead level was 158.0 µg/L. While the number of water samples above the MRL, the number exceeding the USEPA action level, and the 90th percentile were lower in the 1 and 3-minute flushes water samples than the first flush samples, the maximum value in the 1-minute flush was higher. As

discuss above, these flush volumes (approximately 3 L) would have been insufficient to completely flush the entire interior plumbing and service lines of a typical home. In the first, 1-minute and 3-minute flush samples, homes with lead service lines and unknown service line types appeared to have on average higher water lead levels than the homes with galvanized iron service lines, which were higher than those with copper service lines. Thus, individuals who consumed tap water from these homes would have had increased lead ingestion exposure.

The number of homes with water lead levels above the MRL and the median and 90th percentile water lead levels declined in the homes that provided samples after water corrosion treatment was introduced (Pieper, Martin et al. 2018). However, lead remained in drinking water in a subset of the homes through November 2016 due, in my opinion to the processes described above concerning leaching and flaking of lead from the service lines and indoor plumbing in the homes. In fact, the maximum values measured in March 2016 and July 2016 exceeded that measured in August 2015 indicative of the level of variability in water lead levels in a home over time and the continuing damage associated with the corrosive water. It is also of note that a portion of the homes no longer had measurable water lead levels during the samples collected after the water corrosion protocols were put back in place. The lack of measureable water lead levels in samples collected once Flint's water was sourced from Lake Huron and corrosion

protocols were reinstated, such as reported in the Pieper, Martin et al. 2018 study, under the sentinel sampling or voluntary program from concern citizens program (Goovaerts 2017) does not imply that there was no increase in lead in drinking water of those homes during the time period of concern.

An additional consideration in the sampling protocols is the tap water is to be collected from the cold water tap. This is done since it is advised that only cold water should be used to prepare drinks, particularly baby formula, and for cooking to minimize lead exposure, since hot water solubilizes more lead from the interior plumbing than cold water (USEPA 2017). However, this advice is sometimes not known and cooking or preparing hot drinks starting with hot water is faster so this advice is not always followed (Triantafyllidou and Edwards 2012, Clark, Masters et al. 2014).

The time period that residents of Flint were exposed to lead due to the change in the water supply on April 25, 2014 would begin as soon as the water with higher corrosivity after it passed through service lines and interior plumbing of homes, schools, and day care facilities. This is because a new equilibrium associated with the initial leaching of lead is expected to begin when the corrosive water became stagnant in the pipes and interior plumbing for several hours. Exposure to lead from the drinking water would have continued until the water was no longer consumed. For the purposes of this report, the initial date when

exposure is expected to have started is May 1, 2014, to allow for several days for the highly corrosive water to be distributed to homes within the distribution system. As indicated in the Deposition of Dr. Schock when discussing the Flint water system, if you stop pH adjustments the scale in the lead pipe reacts within hours to days and begins to decompose releasing lead into the water. The end date used for this report is January 5, 2016 when Governor Snyder declared a state of emergency in Genesee County warning residents about the dangerous levels of lead in their water. Nonetheless, elevated lead levels in the tap water of Flint were reported past the January 5, 2016 date, and individuals who continued to drink Flint water past that date would have confronted elevated levels of lead for an extended time period.

I reserve the right to amend my expert report and update my opinions if new or additional information becomes available.

V. LIST OF PUBLICATIONS

See Exhibit 1 for my Curriculum Vitae and a list of my publications.

VI. LIST OF ALL CASES

I have not provided any testimony at a trial or in deposition as an expert witness during the past four years.

VII. STATEMENT OF COMPENSATION PAID

My hourly rate for legal consulting for this case is $400.00 per hour. My hourly rate for deposition testimony is $500.00 per hour. My rate for trial testimony is $500.00 per hour for a minimum of seven hours a day if provided outside of New Jersey plus travel expenses.

VIII. EXHIBITS

Attached hereto as Exhibit 1 is my Curriculum Vitae and List of Publications. Attached hereto as Exhibit 2 is my List of References.

I affirm under penalty of perjury that the foregoing is true and correct to the best of my knowledge and recollection.

Executed this 28 day of June, 2020, in Teaneck, NJ.

By: ______________________

Clifford P. Weisel, Ph.D.

EXHIBIT 1

CURRICULUM VITALE

Name: **Clifford P. Weisel**

Home Address: 102 Cherry Lane, Teaneck, NJ 07666

Office Address: Environmental & Occupational Health Sciences Institute (EOHSI)/Rutgers University
Department of Environmental and Occupational Medicine
170 Frelinghuysen Road
Piscataway, NJ 08854
Phone: 848-445-0154
weisel@eohsi.rutgers.edu

Education:

B.S., Chemistry
State University of New York at Stony Brook, 1974
M.S., Analytical Chemistry
University of Rhode Island, 1978
Ph.D., Chemical Oceanography
University of Rhode Island, 1981

Postdoctoral Training:

1981 – 1983 National Research Council Postdoctoral Fellow at NOAA/AOML, Miami, Florida

University Appointments/Professional Experience:

2015 - Present Tenured Professor, Department of Environmental and Occupational Health, School of Public Health, Rutgers University-Robert Wood Johnson Medical School Piscataway, New Jersey

2002 - 2015 Tenured Professor, Department of Environmental and Occupational Medicine Rutgers University-Robert Wood Johnson Medical School Piscataway, New Jersey

1995 – 2018 Deputy Director Exposure Measurement and Assessment Division, Environmental and Occupational Health Sciences Institute (EOHSI)

1994 – 2002 Associate Professor, Department of Environmental and Community Medicine UMDNJ-Robert Wood Johnson Medical School Piscataway, New Jersey

1989 – 1994 Assistant Professor, Department of Environmental and Community Medicine UMDNJ-Robert Wood Johnson Medical School Piscataway, New Jersey

1989 – Present Member of the Environmental and Occupational Health Sciences Institute Piscataway, New Jersey

1989 – Present Member of the Graduate Faculty of the Department of Environmental Sciences of Rutgers The State University of New Jersey

1988 – 1989	Research Associate at the Center for Environmental Science, The College of Staten Island, Staten Island, New York
1986 – 1989	Adjunct Assistant Professor: Graduate Program in Environmental Science, Biology Department and Chemistry Department at the College of Staten Island, Staten Island, New York
1985 – 1988	Research Scientist with the Research Foundation of CUNY at the College of Staten Island, Staten Island, New York
1984 – 1985	Computer Consultant associated with the Plagman Group and Price Waterhouse, New York, New York
1981 – 1983	National Research Council Postdoctoral Fellow at NOAA/AOML, Miami, Florida
1974 - 1981	Research & Teaching Assistant, Graduate School of Oceanography and Department of Chemistry, University of Rhode Island, Kingston, Rhode Island

Awards and Honors

2017	▪ Appointed to Board of Trustees of the Health and Environment Research Institute (HESI)/ILSI
2013	▪ ISES Jerome J. Wesolowski Award in recognition of outstanding contributions to the knowledge and practice of human exposure science
2007-2008	▪ President, International Society of Exposure Science (ISES)
2006	▪ President Elect, International Society of Exposure Analysis
2005	▪ Elected to Sigma Xi Society
2003	▪ Forchhenner Visiting Professor of Genetics at Hebrew University
2000-2003	▪ Treasurer, International Society of Exposure Analysis
May 2000	▪ New Jersey Center for Environmental Indicators Excellence Award
1995-2012	▪ Associate Editor Journal of Exposure Science and Environmental Epidmiology
1981-1983	▪ National Research Council Postdoctoral Fellowship Award
1975-1981	▪ Research Assistantship at the University of Rhode Island
1974-1975	▪ Teaching Fellowship at the University of Rhode Island
1970-1974	▪ New York State Regents Scholarship Award
1970-1974	▪ New York State Scholarship Incentive Award

Committee Appointments/Workshop Participant:

1986-1991	▪ Director of a New York State Department of Health Accredited Laboratory
1986-1991	▪ Chair of the Monitoring/QC subcommittee of the SI/NJ Urban Air Toxic Workgroup
1986-1991	▪ Member of the Quality Assurance subcommittee of the SI/NJ Urban Air Toxic Workgroup
December 1990	▪ Workshop on General Population Exposure to Gasoline (invited

	speaker), Annapolis, MD, (Sponsored by API)
March 1991	▪ Manganese/MMT Workshop, Research Triangle Park, NC, (Sponsored by US EPA)
October 1991	▪ Environmental Health Workshop, Santa Fe, NM, (Sponsored by US EPA)
February 1992	▪ Exposure Assessment Research Workshop on Gasoline, Washington DC, (Sponsored by API)
June 1992	▪ Workshop on Emissions, Modeling and Exposure, Research Triangle Park, NC (Sponsored by Risk Science Institute and USEPA),
1992-1993	▪ Committee to Review the Health Effects in Vietnam Veterans of Exposure to Herbicides, Institute of Medicine, National Academy of Sciences,
1993	▪ MTBE Exposure Workgroup, Washington, D.C.(Sponsored by USEPA and API)
1994, 1995, 1996, 1997	▪ Peer Grant Review Panel, U.S. EPA, Research Triangle Park, NC,
Sept., 1994	▪ Gasoline Emission Workshop, U.S. EPA, Research Triangle Park, NC,
March 1995	▪ Workshop on Disinfection By-Products and Reproductive Effects, Research Triangle Park, NC, (Sponsored by USEPA),
1995-1998	▪ Working Group on the Estimation of Dermal and Inhalation Exposures to Contaminants in Drinking Water,(Sponsored by ILSI Risk Science Institute and USEPA),
1996-1997	▪ Expert Panel on Benzene Exposure for the Harvard School of Public Health, (Sponsored by US EPA as part of National Human Exposure Assessment Study)
1997	▪ Chair of Exposure Section of Workgroup on Research Needed to Reduce Uncertainty in Health Risk Assessment for Ozone, U.S., EPA,
1998-2000	▪ American Water Works Association Project Advisory Committee,
April 26-28, 1999	▪ Workshop on Novel Methods for Risk Assessment of Disinfection By-Product Mixtures in Drinking Water, US EPA, Cincinnati, OH,
1999-2000	▪ Steering Committee of Exposure Assessment for Disinfection By-Products in Epidemiologic Studies, Health Canada, Ottawa Canada,
June 1, 2000	▪ Site Visit Member NIEHS Review of PO1 Proposal for a Center at UNC-CH for Environmental Health and Susceptibility,
2000-Present	▪ Pediatric Asthma Coalition of New Jersey, Environmental Task Forces,
June 2001	▪ Workshop for the American Chemistry Council Long-term Research Initiatives in Exposure
July 2001	▪ NIEHS Reviewer of Community-Based Participatory Research Grants,
July 2001	▪ CDC Workshop to Refine Research Agenda for Tap Water Disinfection Byproducts and Human Health,
June 2002	▪ Expert Panelist Allegheny, PA Health Department on Health Based Indicators
July 2003	▪ External peer panel review of EPA's report Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster
September 2003	▪ US EPA Computational Toxicology Framework Review Panelist,

April 2004	▪ US EPA Grant Review Panel: Environmental Statistics Research: Novel Analyses of Human Exposure Related Data
May 2004	▪ US EPA Peer Review of Issues Relating to EPA Response Activities to the Attacks on the World Trade Center
June 2005	▪ US EPA Workshop on Optimizing the Design and Interpretation of Epidemiologic Studies to Consider Alternate Disinfectants of Drinking Water.
June 2005	▪ US EPA Expert Peer Review of Application of PBPK Modeling in Human Health Risk Assessment
December 2005	▪ Member of the Voluntary Children's Chemical Evaluation Program (VCCEP) for Xylene Peer Review – Co sponsored by Toxicology Excellence for Risk Assessment (TERA) and US EPA
May 2006	▪ NIEHS Exposure Biology Workshop
May 2006	▪ Member of the Voluntary Children's Chemical Evaluation Program (VCCEP) for Toluene Peer Review – Co sponsored by Toxicology Excellence for Risk Assessment (TERA) and US EPA
August 2006	▪ Presenter at Gordon Conference on Drinking Water Disinfectants
December 2006	▪ US EPA Workshop on NOx Exposure
February 2007	▪ Workshop on Assessment of Health Science for the Review of the NAAQS for Nitrogen and Sulfur Oxides
May 2007	▪ External Reviewer for the National Cancer Institute Intramural Program, Occupational and Environmental Epidemiology Branch
August 2007	▪ Workshop on Childhood Asthma and Environmental Exposures at Swimming Pools: State of the Science and Research, Leuven, Belgium , ACC Research Foundation for the Health and Environment
October 2008	▪ US EPA Ozone National Ambient Air Quality Standards Review Workshop
April 2009	▪ US EPA Reviewer at Estimating Benefits of Reducing Hazardous Air Pollutants Workshop
November 2009	▪ Invited Participant US EPA Reviewer EPA Review Panel: 2009 Science To Achieve R Board of Trustees – Health and Environment Science Institute (HESI) / International Life Sciences Institute (ILSI)
	▪ boscesults (STAR): Exploring Linkage between Health Outcomes and Env Hazards, Exposures, and Interventions for Public Health Tracking and Risk Management
January 2010 - present	▪ Member of the US EPA Science Advisory Board on Exposure and Human Health Committee (EHHC)
April 2010	▪ Invited Participant on US EPA Workshop on Optimizing Exposure Metrics for the National Children's Study
June 2010 – present	▪ Member of the NJ Department of Environmental Protection Science Advisory Boards' Public Health Standing Committee
February 2011	▪ US EPA Reviewer for STAR Grants for Student Fellowships
June 2012	▪ HEI Review Ambient Ultrafine Particles: An HEI Perspective
July 2012	▪ NIEHS Review K23, K24 and K99 applications
October 2012	▪ NIEHS Review of Training Grants and T25 Applications
June 2013	▪ NIH/SREA reviewer for a CSR study section meeting
March 2013	▪ Review Residential Indoor Air Quality Guideline Science Assessment Document: Nitrogen Dioxide for Health Canada
April 2013	▪ Workshop Chair on Best Practices for Obtaining, Interpreting and

	Using Human Biomonitoring Data in Epidemiology and Risk Assessment: Chemicals with Short Biological Half-Lives
December 2013	▪ Workshop to Develop Recommendations For Environmental Monitoring Related To Unconventional Oil And Gas Extraction, Sponsored by HEI, NRDC, MAACHE and Harvard Center for Health and the Global Environment
February 2014	▪ Reviewer for NIEHS Cardiovascular and Sleep Epidemiology Study Section Grants
April 2014	▪ Reviewer for NIEHS Special Emphasis Panel for Conference Grants (R13 Applications)
February 2014- January 2015	▪ Institute of Medicine Committee Member on Post Vietnam Dioxin Exposure in Agent Orange-Contaminated C-123 Aircraft
March – April 2015	▪ NIEHS/EPA Center on Environmental Health Disparities Research Study Section
May – July 2015	▪ Reviewer for Grants to NSF-Gulf of Mexico Research Initiative (GOMRI)
August 2015	▪ Reviewer for Grants to NIBIB-U01- Pediatric Research using Integrated Sensor Monitoring Systems (PRISMS): Sensor Development Projects for Asthma
September 2015 - present	▪ Member U.S. Environmental Protection Agency Board of Scientific Counselors Chemical Safety and Sustainability National Research Program-Human Health Risk Assessment National Research Program Subcommittee
February 2016 – June 2017	▪ National Academy of Science Committee to Review of EPA's “Science to Achieve Results” Research Grants Program
April – May 2016	▪ Peer reviewer of U.S. EPA’s draft research study design for “Research for Synthetic Turf Fields with Crumb Rubber Infill”
July, October 2016	▪ Member of the Technical Quality Board for US EPA to review promotion of personnel
July – August 2016	▪ Chair of Review Panel of US EPA “Guidelines for Human Exposure Assessment”
June 2017	▪ Member of the Technical Quality Board for US EPA to review promotion of personnel
September 2016 - present	▪ Board of Trustees – Health and Environment Science Institute (HESI) / International Life Sciences Institute (ILSI)
May 2017	▪ NIEHS Powering Research through Innovative Methods for Mixtures in Epidemiology (PRIME) R01 Study Section
June 2017	▪ NIEHS Support for Scientific Conferences (R13/U13) Study Section
June 2107	▪ Gulf of Mexico Research Initiative, DoMRI Review Panel Theme V Public Health
July 2018	▪ NIEHS Review Panel for R25 Grant Proposal for NIH Summer Research Experience Program
June 2018 – present	▪ Member US Environmental Protections Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP)
July 2019	▪ NIEHS Review Panel for R25 Grant Proposal for NIH Summer Research Experience Program

Professional Society Membership:

American Association for the Advancement of Science
American Chemical Society
The Oceanography Society
International Society of Exposure Science
Sigma Xi
Society of Toxicology

Grant History:

U.S. Environmental Protection Agency, Analysis of Volatile Organic Compounds in the Staten Island Air. Co-I.	9/1987-2/1988
New Jersey Department of Environmental Protection, Human Exhaled Breath Study: Development and Evaluation of a Bag Collection Adsorbent Trap Sampling System - Year 2, P.I.	4/1989-4/1990
U.S. Environmental Protection Agency, Human Exposure Research: Personal and Microenvironmental Measurement and Modeling, Co-P.I.	9/1989-8/1992
New Jersey Department of Environmental Protection, Characteristics and Dynamics of Exposure to Toxic Chemicals in the Staten Island/New Jersey Study, P.I.	6/1990-5/1991
NIEHS Exploratory Research Grant, Chlorination By-Products: Occupational and Community Exposure and Health Effects, P.I.	10/1990-8/1991
GRS Grant - (Robert Wood Johnson Foundation Grant): Evaluation of Exposure to Chlorination By-Products Within a Municipal Water System, P.I.	1/1/1991-12/31/1991
International Life Sciences Institute-Risk Science Institute Grant: Evaluation of Multi Route Exposures to Environmental Contaminants Using Exhaled Breath Analysis, P.I.	2/1/1991-4/30/1993
NIEHS: Groundwater Transport of Neurotoxicants and estimates of the Subsequent Exposure, P.I.	4/1/1992-3/31/1995
UMDNJ Foundation: Mercury Exposure During and Subsequent to Amalgam Restoration, Co-P.I.	7/1/1992-6/30/1993
U.S. Environmental Protection Agency, Human Exposure Research: Personal and Microenvironmental measurement and Modeling, Co-P.I.	9/1992-8/1995
Agency for Toxic Substance and Disease Registry (ATSDR), Proposal to establish a research program for exposure characterization, Co-P.I.	10/1/1992-9/30/1995
NIEHS Exploratory Research Grant, Dermal absorption of haloacetic acids from water, P.I.	11/25/1992-8/31/1993
American Petroleum Institute, Measurement of Automobile Cabin	4/1/1993-12/31/1993

concentrations and estimates of Microenvironmental Exposure to Methyl-t-butyl Ether, Co-P.I.	
New Jersey Department of Environmental Protection and Energy, Evaluation of the Existing Information on Exposure to Volatile Contaminants in Drinking Water, P.I..	11/1/1993-10/30/1994
NIOSH, Lead Solvents, Co-I.	9/1994-3/1998
National Institute of Occupational Safety and Health, Lead Solvents and Neurobehavior in Construction Workers, Co-I.	10/1994-12/1997
Veterans Administration, Persian Gulf Veterans, Co-I.	10/1994-9/1999
New Jersey DEP, Determination of Methylmercury Exposure in the New Jersey Pregnant Population and Investigations of Exposure Correlates, Co-P.I.	12/1994-6/1996
New Jersey DOH, Biological Monitoring of Chlorination By-Products: An Exposure Evaluation for a Case Control Study of Neural Tube Defects and Drinking Water Contaminants, P.I.	12/1994-3/1996
US Environmental Protection Agency, Development of an Exposure Assessment Short Course, P.I.	9/1996-6/1998
New Jersey DEP Ambient Ozone Levels and Adverse Health Effects in Asthmatics in New Jersey, P.I.	7/1997-12/1998
Mickey Leland National Urban Air Toxics Research Center, Contributions of Outdoor Sources to Indoor Concentrations and Personal Exposure to Air Toxics, P.I.	12/1997-11/2001
US Environmental Protection Agency, Inhalation and Dermal Exposure to Disinfection By-Products of Chlorinated Drinking Water, P.I.	10/1997-9/2001
Exposure Assessment, Dover Township, Ocean County, NJ: Assessment of Cumulative Deposition, Co-I.	4/15/1998-3/31/2000
Health Effects Institute, Personal & Microenvironmental Measurements of Human Exposures to Multiple Aldehydes in Three Distinct Urban Areas, Co-I.	6/1/1998-5/31/2001
Health Effects Institute, (Sub-contract from Rutgers University) Contribution of Outdoor PM Sources to Indoor Concentrations and Personal Exposures: A Three - City Study P.I.	7/1/1998-12/31/2002
NIEHS, Modulation of Benzene Metabolism by Exposure to Environmental Mixtures, P.I.	9/1/1998-8/31/2002
RWJ Foundation Exploratory Grant, Optimization of a Telemedicine Tool	1/1/2000-12/31/2000

for Collecting Data on Patient Visits to Physician Offices for Use in Epidemiological Studies, P.I.

New Jersey Department of Environmental Protection, ER Visits and Hospital Admissions of Asthmatics in NJ as Indicators of Ozone Exposure and Effectiveness of Environmental Controls on Ozone Precursors. P.I.	6/1/2000-5/31/2001
US EPA, Subcontract from Battelle Memorial Institute, Inhalation and Dermal Exposure to MTBE Breath Analysis, P.I.	9/2000-8/2001
Mickey Leland National Urban Air Toxics Research Center, Laboratory Analysis Support of: Personal Exposure to Volatile Organic Compounds Among a Subset of the Residential U.S. Population, P.I.	9/2000-12/2001
NJ DEP and Hoffmann LaRoche, Epidemiologic Study to Evaluate Air Pollutant Concentrations in Relation to Pediatric Asthma in Belvidere, Harmony and White Township, P.I.	2/2002-9/2003
ATSDR. Effect of source emissions on school absenteeism in three communities in Warren County, NJ, with high pediatric asthma rate. P.I.	9/2002-8/2005
American Chemistry Council. Diagnostic Evaluation & Refinement of Procedures for Modeling Exposures to VOCs. Co-I.	10/2003-9/2006
NJ DEP Development of Health-Based Indicators for Particulate Matter (PM) Interactions with Other Criteria Pollutants and Adverse Health Effects in NJ, P.I.	9/2003-12/2004
NJ DEP Investigation of Indoor Air Sources of VOC Contamination, P.I.	9/2003-8/2005
US EPA Assessment of the Contribution of Personal Exposure of Air Toxics from Mobile Sources, P.I.	10/2003 – 9/2004
Federal Aviation Administration Air Transportation Center for Airliner Cabin Environmental Research, P.I.	9/2004-8/2007
Meadowland Commission, Assessment of Baseline Quality of the Ambient Air in the Meadowlands District, Co-P.I.	9/2004-8/2007
NIOSH Solvent Exposure: Functional Imaging and Behavior, Co-I	2/2005-12/2008
Mickey Leland NUATRC Final Development of the Database and a Codebook for the RIOPA Study, P.I.	3/2005-12/2005
Federal Aviation Administration Exposure and Risks of Pesticides Used on Commercial Aircraft & Human Exposure to Ozone in Aircrafts: A Simulation, P.I.	4/2005-8/2007
New Jersey Department of Environmental Protection, Exposure and Health Assessment within the Community Surrounding the Martin Luther	6/2006-5/2007

King/Jefferson School Construction Site, P.I.	
NIEHS, National Children's Study, Co-I	9/2006-12/2011
New Jersey Department of Environmental Protection, Evaluation of Bioavailability of Chemicals in Artificial Turf Infill, co-P.I.	1/2010-7/2011
Federal Aviation Administration, Exposure to Pesticides Used on Commercial Aircraft P.I.	9/2007-12/2009
Federal Aviation Administration, Human Exposure to Ozone and it By-Products in Aircrafts: A Simulation, P.I.	9/2007-8/2009
Boeing Corporation, Evaluation of Chemicals that may Adversely Affect the Air Quality within an Aircraft and Cause Symptoms in Passengers and Crew During Extended Flights	4/2008-12/2009
Federal Aviation Administration Evaluation of Flame Retardant Exposure in Aircrafts, co-P.I.	4/2010-9/2014
Federal Aviation Administration Development of a Risk Paradigm for Pesticide and Ozone Exposure in Aircrafts, P.I.	4/2010-9/2012
NIEHS, Small Business Award with Two B Technology, Personal Ozone Monitor, P.I.	9/2010-8/2012
NIEHS, Training Grant for the Graduate Program in Exposure Science, P.I.	7/2011-6/2016
NIEHS-Center for Environmental Exposure and Disease Pilot Grant on Optimizing Metabolomics Protocols to Characterize Exposure to Air Pollution Effects on Human Antimycobacterial Immunity	7/2013-3/2014
Federal Aviation Administration Evaluation of Contaminants in Bleed Air in Aircrafts, P.I.	1/2013-8/2014
Rutgers University Team Science Initiative Award, Establishment of a Rutgers Center on the Lung Microbiome (CoLM), P.I.	7/2014-6/2016
NIEHS – Air Pollution Particle Effects on Human Antimycobacterial Immunity, Supplement to Incorporate Metabolomics, Co-I Schwander PI	9/2014-5/2015
NIEHS – Center CEED Pilot Project on Developing Methods for Characterizing the Lung Microbiome, P.I.	9/2014-3/2015
NIEHS - Activated Macrophages and Ozone Toxicity, Co-I, D. Laskin PI	3/2015-12/2019
NIH Pilot funds from NIEHS CEED/Rutgers University - From Breath to Answer: Highly Efficient Real-Time Collection and Analysis of Exhaled Breath Condensate Using Super-Hydrophobic Materials, Javanmard (PI) Role Co-I	3/2015-3/2017

NJ Department of Health – Biomonitoring of Environmental Contaminants in New Jersey	7/2015-8/2019
NIEHS Center Pilot - Ozone-induced alterations in the lung microbiome. Potential contribution to macrophage activation and lung toxicity Co-I D. Laskin P.I., Kerkhof, Co-I	2/2016-2/2017
L'Oreal - The Effect Of Outdoor Air On Skin Quality And Skin Surface Biomarkers, P.I.	3/2016-9/2017
NIEHS Center Pilot - Perfluoronate Serum Levels in Paulsboro Residents: A Cross Sectional Study, Co-I, Graber P.I., Georgopoulos, Co-I, Marshal, Co-I	6/2016-3/2017
NIEHS, Training Grant for the Graduate Program in Exposure Science, P.I.	7/2016-6/2021
NJ DEP - Collection and Analysis of Household Dust in Plainsboro, NJ and Surrounding Communities for Perflouocarbon (PFC) Compounds, P.I.	9/2016-6/2018
Exxon/Mobile - Evaluation of Robots for Use in Exposure Studies: VOC Exposures During Painting, Exxon/Mobile, P.I.	10/2017-6/2018
Cancer Institute of NJ - New Jersey Fire Fighter Prevention Cancer Study, Co-I, Graber P.I.	2/2019 – 7/2020
ATSDR – CDC - Exposure to PFNA and other PFAS in drinking water and associations with health-related outcomes in Gloucester County NJ, Co-I, Laumbach P.I.	9/2019 – 8/2024

A. Peer Reviewed Publications

1. Weisel, C. P. and J. L. Fasching, "Deceptive 'correct' separation by the linear learning machine," Anal. Chem. 49, 2114-2116, 1977.
2. Piotrowicz, S. R., R. A. Duce, J. L. Fasching and C. P. Weisel, "Bursting bubbles and their effect on the sea-to-air transport of Fe, Cu and Zn," Mar. Chem., 7, 307-324, 1979.
3. Weisel, C. P., R. A. Duce and J. L. Fasching, "Determination of aluminum, lead and vanadium in North Atlantic seawater after coprecipitation with ferric hydroxide," Anal. Chem. 56, 1050-1052, 1984.
4. Piotrowicz, S. R., G. R. Harvey, D. A. Boran, C. P. Weisel and M. Springer-Young, "Cadmium, copper and zinc interactions with marine humus as a function of ligand structure," Mar. Chem.,14, 333-346, 1984.
5. Harvey, G. R., D. A. Boran, S. R. Piotrowicz, and C. P. Weisel, "Synthesis of marine humic substances from unsaturated lipids, "Nature, 309, 244-246, 1984.
6. Weisel, C. P., R. A. Duce, J. L. Fasching, and R. W. Heaton, "The marine flux of trace metals to the atmosphere," J. Geophys. Res. 89, 11607-11618, 1985.
7. Jo, W. K., C. P. Weisel, and P. J. Lioy, "Routes of chloroform exposure and body burden from showering with chlorinated tap water," Risk Analysis, 10, 575-580, 1990.
8. Jo, W. K., C. P. Weisel, and P. J. Lioy, "Chloroform exposure and the health risk associated with multiple uses of chlorinated tap water," Risk Analysis, 10, 581-585, 1990.
9. Weisel, C.P., M. Demak, S. Marcus, and B.D. Goldstein, "Soft Plastic Bread Packaging: Lead

Content and Reuse by Families," American Journal of Public Health, 81, 756-758, 1991.

10. Weisel, C.P., N.J. Lawryk, and P.J. Lioy, "Exposures to emissions from gasoline within automobile cabins," Journal of Exposure Analysis and Environmental Epidemiology, 2, 79-96, 1992.
11. Cody, R.P., C.P. Weisel, G. Birnbaum, and P.J. Lioy, "The effects of ozone associated with summertime photochemical smog on the frequency of asthma visits to hospital emergency departments," Environmental Research, 58, 184-194, 1992.
12. Weisel, C.P., W.K. Jo, and P.J. Lioy, "Utilization of breath analysis for exposure and dose estimates of chloroform," Journal of Exposure Analysis and Environmental Epidemiology, 2 Suppl. 1, 55-69, 1992.
13. Lioy, P.J., T. Wainman, and C.P. Weisel, "A Wipe Sampler for the Quantitative Measurement of Dust on Smooth Surfaces: Laboratory Performance Studies," Journal of Exposure Analysis and Environmental Epidemiology, 3, 315-329, 1993.
14. Weisel, C.P. and W.J. Chen, "Exposure to Chlorination By-Products from Hot Water Uses," Risk Analysis, 14, 101-106, 1994.
15. Bartczak, A., S.A. Kline, R. Yu, C.P. Weisel, W.E. Bechtold, B.D. Goldstein, and G. Witz, "Evaluation of assays for the identification and quantitation of muconic acid, a benzene metabolite in human urine," Journal of Toxicology and Environmental Health, 42, 245-258, 1994.
16. Mohr, S.N., N. Fiedler, C. Weisel, and K.K. McNeil, "The health effects of MTBE among New Jersey garage workers," Inhalation Toxicology, 6, 533-562. 1994
17. Lioy, P.J., C.P. Weisel, W.K. Jo, E. Pellizzari, and J.H. Raymer, "Microenvironmental and personal measurements of methyl-tertiary butyl ether (MTBE) associated with automobile use activities," Journal of Exposure Analysis and Environmental Epidemiology, 4 (4), 427-441, 1994
18. Weisel, C.P., R.C. Cody, and P.J. Lioy, "Relationship between summertime ambient ozone levels and emergency department visits for asthma in central New Jersey," Environmental Health Perspectives, 103 (2), 97-102, 1995.
19. Lawryk, N.J., P.J. Lioy, and C.P. Weisel, "Exposure to volatile organic compounds in the passenger compartment of automobiles during periods of normal and malfunctioning operation, "Journal of Exposure Analysis and Environmental Epidemiology, 5 (4), 511-531, 1995.
20. Berdouses, E., T.K. Vaidyanathan, A. Dastane, C. Weisel, M. Houpt, and Z. Shey, “Mercury release from dental amalgams: An *in vitro* study under controlled chewing and brushing in an artificial mouth,” Journal of Dental Research, 74 (5), 1185-1193, 1995
21. Adgate, J.L., C. Weisel, Y. Wang, G.G. Rhoads, and P.J. Lioy, “Lead in house dust: Relationships between exposure metrics,” Environmental Research, 70, 134-147, 995.
22. Yu, R. and C.P. Weisel, "Measurement of the urinary benzene metabolite, trans, trans-muconic acid, from benzene exposure in humans," Journal of Toxicology and Environmental Health, 48, 453-477, 1996.
23. Yu, R. and C.P. Weisel, “Measurement of benzene in human breath associated with an environmental exposure,” Journal of Exposure Analysis and Environmental Epidemiology, 6 (3), 261-277, 1996.
24. Lawryk, N.J. and C.P. Weisel, “Concentrations of volatile organic compounds in the passenger compartments of automobiles,” Environmental Science & Technology, 30 (3), 810-816, 1996.
25. Weisel, C.P. and W-K. Jo, “Ingestion, inhalation and dermal exposures to chloroform and trichloroethene from tap water.” Environmental Health Perspectives, 104 (1),48- 51, 1996.
26. Roy, A., C.P. Weisel, P.J. Lioy, and P.G. Georgopoulos, “A distributed parameter physiologically based pharmacokinetic model for dermal and inhalation exposure to volatile organic compounds,” Journal of Risk Analysis, 16 (2), 147-160, 1996.
27. Roy, A., C.P. Weisel, M.A. Gallo, and P.G. Georgopoulos, “Studies of multiroute exposure/dose reconstruction using physiologically based pharmacokinetic models, Toxicology and Industrial Health, 12 (2), 153-163, 1996.
28. Chien, Y-C, C.A. Feldman, H.K. Zohn, and C.P. Weisel, “Urinary mercury levels before and after

amalgam restoration," The Science of the Total Environment, 188, 39-47, 1996.
29. Lansari, A., J.J. Streicher, A.H. Huber, G.H. Crescenti, R.B. Zweidinger, J.W. Duncan, and C.P. Weisel, "Dispersion of uncombusted auto fuel vapor within residential and attached garage microenvironments," Indoor Air Journal, 6 (2), 118-126, 1996.
30. Weisel, C., R. Yu, A. Roy, and P. Georgopoulos, Biomarkers of environmental benzene exposure," Environmental Health Perspectives, 104 (Supplement 6), 1141-1146, 1996.
31. Backer, L.C., G.M. Egeland, D.L. Ashley, N.J. Lawryk, C.P., Weisel, M.C. White, T. Bundy, E. Shortt, and J.P. Middaugh, "Exposure to Regular Gasoline and Ethanol Oxyfuel During Refueling in Alaska: Part I, Fairbanks," Environmental Health Perspective, 105(8), 850-855, 1997.
32. Cohen, N., H. Kehrl, B. Berglund, A. O'Leary, G. Ross, J. Seltzer, and C.P. Weisel, "Psychoneuroimmunology", Environmental Health Perspectives 105 (Suppl 2) 527-529, 1997.
33. Lioy, P.J., L-M Yiin, J. Adgate, C. Weisel, and G.G. Rhoads, "The Effectiveness of the CLEARS Home Cleaning Intervention in Reducing Dust Loading, and Lead Loading, and Concentration," Journal of Exposure Analysis and Environmental Epidemiology, 8 (1), 17-35, 1998.
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C. Letters to the Editor and Editorials:

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D. Presentations/Proceedings:

1."Fractionation of Fe, Cu, Zn and Cd during the production of atmospheric sea salt particles at the

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7. "Analysis of urban air samples for VOC's", with J. Oppenheimer, Eastern Analytical Symposium, New York, NY, October 1988, pp 230.
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18. "The development and validation of a reliable household dust surface wipe sampler", with P. Yang, T. Wainman, J. Adgate, D. Burns and P. J. Lioy, International Symposium, Durham, NC, May 1992, pp 791-795.
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31. "Soil gas entry into below-grade basements as an exposure route for trichloroethene", with D. Fischer and C. Uchrin, International Congress on Hazardous Waste: Impact on Human and Ecological Health, Atlanta, GA, June 1995, pp 137.
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33. "Biomarkers of environmental benzene exposure", with R. Yu, A. Roy and P. Georgopoulos, Benzene '95: International Conference on the Toxicity, Carcinogenesis, and Epidemiology of Benzene, June 1995.
34. “The Effect of a Dust Lead Control Program Combined with Health Education on Blood Lead in Toddlers: A Randomized Study”, with G.G. Rhoads, A.S. Ettinger, K.D. Goldman, D. Paschal, J. Adgate, T. Buckley, P.J. Lioy, American Public Health Association, NY, NY, November 1996.
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57. "Human Exposure Assessment: Biomarkers of Exposure", 2nd International Conference on The

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58. "Biomarkers of Exposure in Environmental Medicine", Occupational Medicine Residents' Seminar Series, EOHSI/UMDNJ, Piscataway, NJ, December 21, 1999.
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88. **"**Exposure Science: Linking the Environment to Health" Technion University, Haifa Israel, January 22, 2009.
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92. "Pesticides Levels on Surfaces of Commercial Aircraft" with Binnian Wei and Krishnan Mohan at the Annual Meeting of the International Society of Exposure Science, Minneapolis, MN October, 2009
93. "Computational Studies of Exposures to Pesticides in Aircraft Cabins" with Sastry Isukapalli, Pradeep George, Sagnik Mazumdar, Yan Chen, and Binnian Wei at the Annual Meeting of the International Society of Exposure Science, Minneapolis, MN October, 2009
94. "Ozone and Ozone-derived Oxidation Products on Commercial Aircraft" with Charles Weshler, Krishnan Mohan, Seema Bhanger and William Nazaroff at the Annual Meeting of the International Society of Exposure Science, Minneapolis, MN October, 2009
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107. "Incorporating Biomarkers in Exposure Science and Educating our Next Generation of Scientists." Jerome J. Wesolowski Award Lecture, Annual Meeting of the ISEE, ISES and ISIAQ Basel Switzerland, 19-23 August 2013.
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110. "Effectiveness of Washing for Removing Pesticides from Fruit", with Pavilonis, 7th International Conference of Children's Health and the Environment (INCHES), Jerusalem, Israel, November 20-22, 2013
111. "Evaluation of At-Home Methods to Reduce Pesticide Residue on Apples and Peaches" with Pavilonis, 2014 Annual Society of Toxicology Meeting, March 21-26, 2014.
112. "A Tool to Reduce Uncertainty in Risk Characterization: Combining Bio-Accessibility of Metals in Soils from Simulated Gastrointestinal Fluids with In Vitro Cell-Based Bioassays for Toxicity" with Hylton, Bucklye, Laskin, Buckley and Lioy, 2014 Annual Meeting of ISES, Cincinnati, OH, October 12-16, 2014
113. "A Controlled Exposure Study of Self-report Symptoms in Response to Organic Compound Mixtures Typical of Aircraft Cabin Environments" with Fiedler, Space, Mohan, McNeil, 2014 Annual Meeting of ISES, Cincinnati, OH, October 12-16, 2014
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118. "A Tribute to Paul Lioy", 25th Annual ISES Meeting, Henderson, NV, USA**,** October 18-22, 2015
119. **"**Research Ethics Challenges with Analyzing 9/11 Dust: New Frontiers in Exposure Science", University of Kentucky Bioethics Series, September 15, 2016.
120. "Performance of Cairpol CairClip NO_2 and Combined O3-NO_2" with A Cole, S, Jeong, Eastern Analytical Symposium, Somerset, NJ October 2017.
121. "Toddlers' inhalation exposure to pyrethroids in homes" with J. Zhou, 26th Annual ISES Meeting, Utrecht, The Netherlands, October 2016
122. "Measurement Of Nitrite Levels In Exhaled Breath Condensate Samples Using Electrochemically Reduced Graphene Oxide Based Sensor" with Gholizadeh, A., Voury, D/. Kipen, H., Laumbach, R. Chhowalla, M and Javanmard, M. at the NIEHS Fest, Raleigh, NC, December 2016.
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Javanmard, M. at the 27th Annual ISES Meeting, Raleigh, NC, October 2017

124. "Analysis and Identification of Ozone-Squalene Particulate Phase By-Products" with B. Coffaro, at the 27th Annual ISES Meeting, Raleigh, NC, October 2017
125. "Analysis and Identification of Ozone-Squalene Particulate Phase By-Products" with B. Coffaro and C. Ho, at the 2017 Eastern Analytical Symposium, Plainsboro, NJ November 2017
126. "Analysis of Particulate Phase Squalene-Ozone Reaction By-Products" with B. Coffaro, 15 Conference of the International Society of Indoor IAr Quality & Climate: Indoor Air 2018, Philadelphia, PA, July 2018
127. "Evaluation of Exposure to Perfluoronated Chemicals (PFCs) due to Contamination of Drinking Water in Gloucester County, New Jersey" with B Parsa, Z Fan, C Yu, P Georgopoulos, ISES-ISEE 2018 Annual Meeting, Ottawa, Canada, August 2018
128. "Exploring the Use of Robots for Exposure Studies" with E. Cook, K. Mohan, R Shome, K Bekris, J Shin, ISES-ISEE 2018 Annual Meeting, Ottawa, Canada, August 2018
129. "Particle Generation Analysis of Squalene-Ozone Reactions" with B. Coffaro, ISES-ISEE 2018 Annual Meeting, Ottawa, Canada, August 2018
130. "Perfluoroalkyl Substances (PFAS) Blood Levels And Health Outcomes in Residents Following Contamination of the Community Water Supply In Paulsboro, New Jersey" with J. Graber, A Cora, R Laumbach, M Zhongyuan, K Black, P Georgopoulos. , ISES-ISEE 2018 Annual Meeting, Ottawa, Canada, August 2018
131. "A Pilot Study of Air Quality in Puerto Rico after Hurricane Maria" with N. Thomas, L. Calderon, S. Alimokhtari, S. Barret-Rios, B Boanos-Roser, C Rodriges, B. Buckley, G. Mainelis, International Aerosol Conference, St. Louis, Missouri, September 2018
132. "Performance of Electrochemical Sensor of Nitrite, a Biomarker of Oxidative Stress, in Exhaled Breath Condensate" with A. Cole, A. Gholizadeh, M. Javanmard, V. Mishin at the 2018 Eastern Analytical Symposium, Plainsboro, NJ, November 2018
133. "Evaluation of Effectiveness of an Intervention for Communities Exposed to PFNA-contaminated Drinking Water in New Jersey" with CH. Yu, S. Alimokhtari, D. Riker, P. Georgopoulos, T. Fan, International Society of Exposure Science/International Society of Indoor Air Quality Annual Meeting, Kaunas, Lithuania, August 2019.
134. "Ozone Reactions with Squalene: Particle Seeding and Formation" with B. Coffaro at the 37th American Associate of Aerosol Research Annual Conference, Portland, OR, October 2019
135. "Exposure to Perfluoroalkyl Substances (PFAS) due to Contamination of Drinking Water in Gloucester County, New Jersey: Evaluating the Effectiveness of an Intervention through Biomonitoring and Modeling" with Z. Fan, CH Yu, L. Chao, Z. Mi, PG. Georgopoulos at the American Public Health Association Annual Meeting, Philadelphia, PA, November 2019.

E. Conference Session Chair/Organizer:

1. "Staten Island/New Jersey Urban Air Toxics Assessment Project" at the 1991 US EPA/AWMA International Symposium on Measurements of Toxic and Related Air Pollutants, Conference Chair, Durham, NC, May 1991.
2. "Measurements of Exposures" at the First Annual Meeting of the International Society for Exposure Analysis: Measuring, Understanding and Predicting Exposures in the 21st Century, Conference Chair, Atlanta, GA, November 1991.
3. "Dose Reconstruction" at the International Congress on the Health Effects of Hazardous Waste, Conference Chair, Atlanta, GA, May 1993.
4. "Impact on Human and Ecological Health" at the International Congress on Hazardous Waste, Member Conference Steering Committee, Atlanta, GA, June 1995.
5. "Benzene 95" at the International Conference on the Toxicity, Carcinogenesis and Epidemiology of Benzene, Member Organizing Committee, Piscataway, NJ, June 1995.

6. "Multimedia Exposure-Issues, Needs and Advances" at the 7th International Society of Exposure Analysis, Session Chair, Research Triangle Park, NC, November 1997.
7. "Volatile Organic Air Pollutions" at the Annual Meeting of the International Society of Environmental Epidemiologist/International Society of Exposure Analysis Joint Conference, Session Chair, Boston, MA, August, 1998.
8. "The Relationship of Indoor Outdoor and Personal Air (RIOPA) Study," International Society of Environmental Epidemiologist/International Society of Exposure Analysis Joint Conference, Session Chair, Athens, Greece, September 1999.
9. "Biomarkers of Exposures" at the Exposure Assessment for Disinfection By-Products in Epidemiologic Studies, Session Chair, Ottawa, Canada, May, 2000.
10. "Exposure Medium - Water" at the Annual Meeting of the International Society of Exposure Analysis, Session Chair, Charleston, SC, November, 2001.
11. "Exposure and Health Interface." at the Annual Meeting of the International Society of Exposure Analysis, Session Chair, Philadelphia, PA October, 2004
12. "Biomonitoring Methods Development" at the Annual Meeting of the International Society of Exposure Analysis, Session Chair, Philadelphia, PA October, 2004
13. "Advancing the Science: Childhood Asthma and Environmental Exposures at Swimming Pools" Workshop Co-Chair, Leuven, Belgium, August 22-23, 2007
14. "Exposures in Aircraft Cabins – ACER-RITE FAA Center of Excellence" at the Annual Meeting of the International Society of Exposure Science, Session Chair, Minneapolis, MN October, 2009
15. "Workshop on Exposure Science & Assessment" sponsored by Israel Environmental Health Fund, Kfar Maccabiah, Ramat Gan., Israel, January 11-13, 2010
16. "Exposure in Commercial Aircraft Cabins" at the Annual Meeting of the International Society of Exposure Analysis, Session Chair, Cincinnati, OH October, 2014

EXHIBIT 2

LIST OF REFERENCES

Exhibit	**Description**
1	Aug. 14-2019 EGLE 0002603-4 Water Lead Levels of Individual Homes Analyzed for the LCR
2	*Carthan et al. v. Snyder et al.*, 5:16-cv-10444-JEL-MKM, *Fourth Consolidated Amended Class Complaint for Injunctive and Declaratory Relief, Money Damages, and Jury Demand*, ECF No. 620-3, PageID.17802-18022 (E.D. Mich. Oct. 5, 2018).
3	City of Flint (2011). 2011 Consumers Annual Report of Water Quality. Water Plant and Facilities. Flint, MI, City of Flint**:** 4
4	Clark, B., S. Masters and M. Edwards (2014). "Profile Sampling To Characterize Particulate Lead Risks in Potable Water." Environmental Science & Technology **48**(12): 6836-6843
5	Clark, B. N., S. V. Masters and M. A. Edwards (2015). "Lead Release to Drinking Water from Galvanized Steel Pipe Coatings." Environmental Engineering Science **32**(8): 713-721
6	Deshommes, E., R. C. Andrews, G. Gagnon, T. McCluskey, B. McIlwain, E. Doré, S. Nour and M. Prévost (2016). "Evaluation of exposure to lead from drinking water in large buildings." Water Research **99**: 46-55
7	Dingle, A. (2016). The Flint Water Crisis: What's Really Going On? Chemistry Matters Online, American Chemical Society
8	Goovaerts, P. (2017). "The drinking water contamination crisis in Flint: Modeling temporal trends of lead level since returning to Detroit water system." Sci Total Environ **581-582**: 66-79

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16 Miller-Schulze, J. P., C. Ishikawa and J. A. Foran (2019). "Assessing lead-contaminated drinking water in a large academic institution: a case study." Journal of Water and

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